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Environmental and Health Aspects of Hexachloroethane: A Comprehensive Bibliography of Published Literature 1930-1981

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Environmental and Health Aspects of Hexachloroethane

A Comprehensive Bibliography of Published Literature

1930 - 1981

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16. Abstract (Limit: 200 words)

This document is a bibliography of published citations on health and environmental aspects of Hexachloroethane (Chemical Abstacts Service Registry Number 67-72-1) for the period 1930 to May 1981. The citations have been selected from a thorough literature search, and broadly classified as having primarily environmental or biological emphasis. The sources used in the search are identified, and for the portion performed on-line, the search strategies are also included.

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ENVIRONMENTAL AND HEALTH ASPECTS OF HEXACHLOROETHANE

A Comprehensive Bibliography
of Published Literature
1930 - 1981

by

Management Support Division
Information Support Services Branch
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Preface

This bibliography was created from a literature search performed under the auspices of the Management Support Division, Information Support Services Branch for the Assessment Division, Chemical Review and Evaluation Branch; both of the Office of Toxic Substances. The search was intended to provide partial support for the preparation of a Preliminary Risk Assessment on hexachloroethane (67-72-1). This assessment reviews and evaluates the available significant economic and adverse effects data from both published and unpublished sources on a substance selected as being potentially hazardous to human health or the environment.

The subject coverage of the assessment is broader than this bibliography which includes only published environmental and biological information. The bibliography does not include all information available to the review branch. Although it is not an authoritative source list for Preliminary Risk Assessments, it does represent a comprehensive and systematic search of the literature and subsequent selection of citations that pertain to health and the environment. The limits of the search are fully described in this document and its appendices.

Introduction

1. The Search

This bibliography is a compilation of citations retrieved during a thorough review of the national and international literature on hexachloroethane (Chemical Abstracts Service Registry Number 67-72-1) cited between 1930 and April 1980.

The supporting search was performed at the request of the Assessment Division/Chemical Review and Evaluation Branch by the Management Support Division/Information Support Services Branch, within the Office of Toxic Substances.

1.1. Scope

To insure that the search was comprehensive, a variety of sources were examined, including the following:

- On-line databases from major vendors of bibliographic information.
- On-line databases from various agencies of the United States Government.
- Manually searched national and international indices and abstract collections of scientific literature.
- Reference sections of major review articles, criteria documents, monographs, and reports.
- Selected handbooks.

(A complete listing of sources consulted can be found in Appendices I and II).

The emphasis of this bibliography is on the primary literature except for the handbook information presented in Section II and a few secondary sources selected because they contain unique or well-summarized information on the chemical.

Subsequent to the main search, which was completed in April 1980, and using the same strategy, update searches were performed during the period from April 1980 to May 1981 on all the on-line databases initially searched. In addition, the April 1981 and May 1981 issues of Current Contents (Life Sciences, Agriculture, Biology, and Environmental Sciences series) were screened to retrieve citations which may not have been entered into the on-line files at the time of the final update searches.

Because the overall requirement of the search request for this project was broader than the health and environmental aspects of the chemical, a wider range of databases was searched than might normally be expected for this bibliography. However, only health and environmental aspects were selected regardless of the data source examined. The total complement of databases searched is listed in the appendices for the user's reference.

1.2. Strategy

The search requirement demanded high recall of information dealing with hexachloroethane; precision was a secondary consideration. EPA decided to retrieve all citations that contained the term hexachloroethane or its synonyms in any searchable fields and to select relevant citations by a manual screen. The Chemical Abstract Service registry number (CAS RN) and systematic names and synonyms that could be identified from CHEMLINE (National Library of Medicine); CHEMDEX (System Development Corporation); CHEMNAME, CHEMSEARCH, and CHEMSIS (Lockheed Information System); SANSS (NIH/EPA Chemical Information System); and RTECS (NIOSH Registry of Toxic Effects of Chemical Substances) were used in the search on databases. For on-line searching, the names were divided into significant fragments and entered according to the conventions of the individual databases.

Chemical terms used in this search were as follows:

CAS RN: 67-72-1
Ethane, hexachloro- (8CI, 9CI)
Avlothane
Carbon Hexachloride
Distokal
Distopan
Egitol
Ethane, Hexachloride
Ethylene, Hexachloride
Falkitol
Fasciolin
Hexachlo-aethan
Hexachloroethane
Hexachloroethylene
Mottenhexe
NCI-C04604
Perchloroethane
Phenohep

No additional modifiers or keywords were used to limit information retrieved in any database for this chemical because comprehensive retrieval was desired. Complete search strategies are listed in Appendix II.

Use/application categories were not used as search terms because EPA decided to select only terms that specifically mentioned the chemical or its synonyms. Indexing policy, keyword entry, and abstracting techniques usually assure retrieval of specific information on individual chemicals if they are discussed significantly in general articles or reviews. The user can be assured, therefore, that each citation listed in this bibliography contains substantive information on the subject chemical.

Manual sources, indices, and abstract collections usually employ their own unique indexing schemes for chemical information, so it is difficult to describe a standard search strategy for these information tools. However, in all cases, the most specific indexing terms available in the source were used to identify citations on the subject chemical.

1.3. Selection of Citations

Citations were selected for inclusion in this bibliography based on their relevance to the following topics:

- Toxicity -- Adverse and toxic effects on any biological systems, structural and functional changes in organs and tissues of all vertebrate and invertebrate species, test methods used for determination of toxicity, and bioassay studies.
- Physiology -- Absorption, distribution, transport, metabolism, and elimination in all species; techniques for measurement of tissue and organ residues; interactions with endogenous substances.
- Epidemiology -- Exposure data, morbidity, and mortality rates for general and occupational populations.
- Environmental Significance -- Environmental distribution in air, soil, and water; sources of pollution; ecological effects on microorganisms, insects, plants, and wildlife; biodegradation and bioconcentration; analytical techniques for sampling and measurement in the environment.
- Safety, Control, and Regulations -- Disposal hazards; Federal, local, and international controls, recommendations, and regulations.

These are the broad specifications for inclusion in this bibliography. Because any literature selection process involves subjectivity and judgement, precise definitions are difficult. The general guiding requirement for inclusion is that citations must pertain to the biological or environmental aspects of the chemical.

The following information is not included in this bibliography:

news items; brief announcements and Federal Register notices; reports of on-going research which have not yet been published or any other unpublished information; draft reports; and private communications.

2. Organization of Bibliography

This bibliography is organized into three major sections.

2.1. Section Titles

Section I — Handbook information
Section II — Citations from the primary literature
Section III -- Appendices listing specific sources used and exact search strategies employed

2.2. Citation Format

In Section II citations from on-line and manually searched abstract collections are arranged alphabetically by author.

Personal names are entered with the last name first followed by the first two initials. Second and third authors' names are separated from the first author and each other by a semicolon. Up to three personal names are used; if there are more than three authors, the remaining are listed as "et al."

If an author has written more than one article, citations are arranged in ascending chronological order. If authors and date are identical, citations are arranged alphabetically by title of the article. Single author entries are listed first, followed by two, then three author entries.

Patents are arranged alphabetically by assignee name.

All government publications are listed by the sponsoring government agency. Government or corporate names are written in full form. No acronyms are used. The country of origin is listed first, followed by the organizational hierarchy of the sponsoring group listed in descending hierarchical order. If the performing organization or individual author is known, they are listed on separate lines below the government sponsor.

Example: NIOSH publication:

United States. Department of Health, Education and Welfare. Public Health Service. Center for Disease Control. National Institute for Occupational Safety and Health
Tracor Jitco, Inc.
Brown, R.A.; Smith S.S.

Corporate documents with no specific author are listed in alphabetical order according to the first significant word of the organization name.

e.g., DuPont de Nemours, E.I. and Company

2.3. Literature Cited

The following kinds of literature are cited in this bibliography: journal articles, government reports, patents, organization and corporate reports, books, manufacturer's literature, conference proceedings, and dissertations.

In each case an attempt has been made to supply the user with enough information so that the hard copy of the document may be easily obtained.

Journal titles are abbreviated according to the style in the Chemical Abstracts Service Source Index (CASSI), The American Chemical Society, Columbus, OH, 1980 and its corresponding guide, Bibliographic Guide for Editors and Authors, The American Chemical Society, Washington, DC, 1974.

All foreign titles have been translated into English. Foreign language articles are indicated by the appropriate three letter language abbreviation in parentheses at the end of the source information.

2.4. Categorization of Citations

In order to make this bibliography a more useful tool for separate user groups, most citations are marked with the category code E or H.

> E = Environmental Aspects, i.e., the major content of the document pertains to the chemical in the open environment: its distribution, degradation, environmental chemistry and analysis; effect on ecosystems; effect on flora and fauna, including laboratory research, when emphasis is on environmental considerations rather than prediction of human effects, environmental chemistry, and analysis.
>
> H = Health Aspects, i.e., the major content of the document concerns known health effects, predictive laboratory research, and animal studies as relates to human health effects, human exposure, and epidemiological studies.

A decision was made based on the abstract, and in some cases the entire document, to categorize according to what appeared to be the major purpose of the study. In a few cases neither category applies. Those citations were left unclassified.

HANDBOOK

AND

DATABANK

INFORMATION

3. Handbook and Databank Information

3.1. Summary Databanks for Health Effects Data

	(Information found)
United States. Department of Health and Human Services. Public Health Service. Center for Disease Control. National Institute for Occupational Safety and Health Registry of Toxic Effects of Chemical Substances. Cincinnati, OH: NIOSH, 1980	yes
United States. Department of Health and Human Services. Public Health Service. National Institutes of Health. National Library of Medicine Toxicology Data Bank. Bethesda, MD 1980	yes

3.2. Handbooks Searched for Health Effects

Source	Location of Information
Browning, E. Toxicity and Metabolism of Industrial Solvents. New York: Elsevier Publishing Co., 1963	None
Browning, E. Toxicity of Industrial Metals. New York: Appleton-Century-Crofts, 1969	None
Dittmer, D.S., Editor Handbook of Toxicology, V. - Fungicides. Philadelphia: W. B. Saunders Company, 1959	None
Dreisbach, R.H. Handbook of Poisoning: Diagnosis and Treatment. Los Altos, CA: Lange Medical Publications, 1974	p. 142-3
Fishbein, L. Potenial Industrial Carcinogens and Mutagens. New York: Elsevier Scientific Publishing Co., 1979	pp. 224
Fishbein, L.; Flamm, W.G.; Falk, H.L. Chemical Mutagens. New York: Academic Press, 1970	None
Goodman, L.S.; Gilman, A., Editors The Pharmacological Basis of Therapeutics. New York: Macmillan Publishing Co., Inc., 1975	None
Gosselin, R.E.; Hodge, S.C.; Smith, R.P.; et al. Clinical Toxicology of Commerical Products. Baltimore, MD: Williams and Wilkins, 1976	p. 112
International Technical Information Institute Toxic and Hazardous Industrial Chemicals Safety Manual. Tokyo: ITII, 1975	pp. 664-5

3.2. Handbooks Searched for Health Effects (cont'd)

Source	Location of Information
Patty, F.A., Editor Industrial Hygiene and Toxicology. New York: Interscience Publishers, 1963	pp. 1297-9
Plunkett, E.R. Handbook of Industrial Toxicology. New York: Chemical Publishing Co., Inc., 1976	pp. 206-7
Sax, N.I. Dangerous Properties of Industrial Materials. New York: Van Nostrand Reinhold Co., 1979	p. 718
Searle, C.E., Editor Chemical Carcinogens. Washington, DC: American Chemical Society, 1976	None
Shepard, T.H. Catalog of Teratogenic Agents. Baltimore, MD: The Johns Hopkins University Press, 1976	None
Spector, W.S., Editor Handbook of Toxicology, V. I. - Acute Toxicities. Philadelphia: W. B. Saunders Company, 1956	p. 156
Spector, W.S., Editor Handbook of Toxicology, V. II. - Antibiotics. Philadelphia: W.B. Saunders Company, 1957	None
Spector, W.S., Editor Handbook of Toxicology, V. III. - Insecticides. Philadelphia: W.B. Saunders Company, 1959	pp. 377
Steere, N.V. CRC Handbook of Laboratory Safety. Boca Raton, FL: CRC Press, Inc.	pp. 696-7

3.2. Handbooks Searched for Health Effects (cont'd)

Source	Location of Information
Sunshine, I., Editor CRC Handbook Series in Analytical Toxicology. Boca Raton, FL: CRC Press, Inc., 1979	pp. 632-3
United Nations. International Agency for Research on Cancer IARC Monographs on the Evaluation of the Carcinogenic Risk of Chemicals to Humans. Vol. 20. Lyon, France: IARC	pp. 467-74
United Nations. International Labour Office Encyclopedia of Occupational Health and Safety. New York, NY: McGraw-Hill Book Co., 1972	pp. 689-91
United States. Department of Health and Human Services. Public Health Service. Center for Disease Control. National Institute for Occupational Safety and Health NIOSH Criteria Documents. Cincinnati, OH: NIOSH	None
United States. Department of Health and Human Services. Public Health Service. National Institutes of Health. National Cancer Institute NCI Carcinogens Bioassay Reports. Springfield, VA: National Technical Information Service	Entire document
United States. Department of Health and Human Services. Public Health Service. Center for Disease Control. National Institute for Occupational Safety and Health Current Intelligence Bulletin 27: Chloroethanes: Review of Toxicity. Cincinnati, OH: NIOSH, 24 pp., Aug. 21, 1978	Yes
United States. Department of Health and Human Services. Public Health Service. National Institutes of Health. National Cancer Institute Survey of Compounds Which Have Been Tested for Carcinogenic Activity. Bethesda, MD: NCI, 1978	None

3.2.
Health Effects (cont'd)

Handbooks Searched for

Source	Location of Information
United States. Environmental Protection Agency EPA Publications Bibliography. Washington, DC, EPA	78(3):69 79(4):26

3.3. Handbooks Searched for Environmental Effects

Source	Location of Information
Applegate, V.C.; Howell, J.H.; Hall, A.E.; et al. Toxicity of 4,346 Chemicals to Larval Lampreys' and Fishes: Special Scientific Report. Fisheries No. 207, Washington, DC, 1957	p. 367
McKee, J.E.; Wolf, H.W., Editors Water Quality Criteria, 2nd Edition. California State Water Resources Control Board, 1963	None
Ryckman, D.W.; Prabhakara Rao, A.V.S.; Buzzel, J.C. Behavior of Organic Chemicals in the Aquatic Environment. Washington, DC: Manufacturing Chemists' Association, 1966	None
United States. Environmental Protection Agency Review of the Environmental Fate of Selected Chemicals. Springfield, VA: National Technical Information Service, 1977	None
United States. Environmental Protection Agency Review of the Environmental Fate of 129 Priority Pollutants. Springfield, VA: National Technical Information Service, 1977	Chap. 48,
Verschueren, K. Handbook of Environmental Data on Organic Chemicals. New York: Van Nostrand Reinhold Co., 1977	pp. 366-7

3.4. Handbooks Searched for Physical and Chemical Properties

Source Information	Location of
Aldrich Chemical Company, Inc. Aldrich Catalog Handbook of Fine Chemicals. 1981-2. Milwaukee, WI: Aldrich Chemical Co., 1980	p. 471
Bennet, H., Editor Concise Chemical and Technical Dictionary. New York: Chemical Publishing Co., Inc., 1974	p. 538
Dreisback, R.R. Physical Properties of Chemical Compounds. Washington, DC: American Chemical Society, 1959	None
Grasselli, J.G.; Ritchey, W.M., Editors CRC Atlas of Spectral Data and Physical Constants for Organic Compounds. Boca Raton, FL: CRC Press, 1975	Vol. III, p. 256
Grayson, M., Editor Kirk-Othmer Encyclopedia of Chemical Technology. New York: Interscience Publishers, 1979	5:405-7, 737-9, 747, 756
Hawley, G.G. The Condensed Chemical Dictionary. New York: Van Nostrand Reinhold Co., 1977	p. 437
Kortum, G.; Vogel, W. Dissociation Constants of Organic Acids in Aqueous Solution. London: Butterworths, 1961	None
Leo, A.; Hansch, C.; Elkins, D. Chemical Reviews. Claremont, CA: Department of Chemistry, Pomona College, 1971	None
Linke, W.F. Solubilities of Inorganic and Metal-Organic Compounds. New York: D. Van Nostrand Co., Vol. I. 1958, Vol. II. 1965	None

3.4. Handbooks Searched for Physical and Chemical Properties (cont'd)

Source	Location of Information
Mark, H.F.; Gaylord, N.G.; Bikales, N.M., Editors Encyclopedia of Polymer Science and Technology. New York: Interscience Publishers, 1964	None
Perry, R.H.; Chilton, C.H., Editors Chemical Engineers Handbook. New York: McGraw-Hill Book Co., 1973	Part 3, p. 56
Pollock, J.R.; Stevens, R., Editors Dictionary of Organic Compounds. London: Eyre and Spottiswoode Publishers, Ltd., 1965	p. 1589
Stephen, H.; Stephen, T.; Editors Solubilities of Inorganic and Organic Compounds. New York: The Macmillan Co., 1963	None
Weast, R.C., Editor CRC Handbook of Chemistry and Physics. Boca Raton, FL: CRC Press, 1979	p. C-293
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E Bioconcentration and Elimination of Selected Water Pollutants by Bluegill Sunfish.
Proceedings: National Meeting of the American Chemical Society, Division of Environmental Chemistry.
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APPENDICES

Appendix I

Abstract Collections Manually Searched

Source	Period of Coverage
Chemical Abstracts*	(1930-1976)
Biological Abstracts*	(1930-1970)
Excerpta Medica*	
Physiology, Biochemistry, Pharmacology, Toxicology	(1965-1974)
Cancer	(1953-1974)
Public Health, Social Medicine, Hygiene	(1955-1974)
Clinical Biochemistry	(1969-1974)
Pharmacology and Toxicology	(1969-1974)
Occupational Health	(1972-1975)
Current Contents	
Life Sciences	(Oct. 1979-Mar. 1980) (Apr. 1981-May 1981)
Physical Sciences	(Oct. 1979-Mar. 1980) (Apr. 1981-May 1981)
Agriculture	(Oct. 1979-Mar. 1980) (Apr. 1981-May 1981)
Industrial Hygiene Digest	(1943-1979)
Index Medicus*	(1930-1976)
Toxicology Research Projects Directory	(Oct. 1979-Mar. 1980)

*Recent issues searched on-line.

Appendix II

On-Line Databases Searched

National Library of Medicine (MEDLARS)

File	Coverage Period of File
+ indicates that the database is continually updated.	
Chemline	N/A
Toxline	1974+
Toxback	1965-1973
Cancerlit	Jan. 1963+
Cancerproj	1976-1978
Medline	Jan. 1977+
Back 66	Jan. 1966-Dec. 1968
Back 69	Jan. 1969-Dec. 1971
Back 72	Jan. 1972-Dec. 1974
Back 75	Jan. 1975-Dec. 1976
Back 77	Jan. 1977-Dec. 1977
SDILINE	Present Month's Update
Toxicology Data Bank	N/A
RTECS	1978 Edition

Search	Strategy
(RN)	67-72-1
(TW)	Avlothane
(TW)	Carbon and Hexachloride
(TW)	Distokal
(TW)	Distopan
(TW)	Egitol
(TW)	Ethane and Hexachloride
(TW)	Ethylene and Hexachloride
(TW)	Falkitol
(TW)	Fasciolin

Appendix II

On-Line Databases Searched (cont'd)

Department of Energy (RECON)

File	Coverage Period of File

+ indicates that the database is continually updated.

Water Resources Abstracts	1968+
Environmental Mutagen Information Center	1969+
Environmental Teratogen Information Center	1975+

Search Strategy

IT= hexachloroethane
RN= 67-72-1

Chemical Information System*

Structure and Nomenclature Search System (SANSS)
(RN) 67-72-1

*Searched to obtain synonyms only

National Institute for Occupational Safety and Health

NIOSHTIC	1973+

+ indicates that the database is continually updated.

Search Strategy

hexachloroethane
67-72-1

Appendix II

On-Line Databases Searched (cont'd)

Department of Energy (RECON)

Search	Strategy
(TW)	Hexachlo and aethane
(TW)	Hexachloroethylene
(TW)	Mottenhexe
(TW)	Perchloroethane
(TW)	Phenohep

All search statements were combined with the logical operator "or" before printout.

Appendix II

On-Line Databases Searched (cont'd)

Lockheed Information Systems (DIALOG)

File	Coverage Period of File

+ indicates that the database is continually updated

Agricola	Aug. 1971+
Air Pollution Technical Information Center	1976-Sep. 1978
Aquatic Sciences and Fisheries Abstracts	Jan. 1975+
Biosis Previews	1969+
Chemical Abstracts Search	1970+
Commonwealth Agriculture Bureaux Abstracts	Jan. 1973+
Chemical Industry Notes	1974+
Chemname	N/A
Claims/Chem	1950-1970
Comprehensive Dissertation Abstracts	1861+
Conference Papers Index	1973+
Current Research Information System	Jul. 1974+
EIS Industrial Plants	N/A
Enviroline	1971+
Environmental Periodicals Bibliography	1973+
Excerpta Medica	Jun. 1974+
Food Science & Technology Abstracts	1969+
GPO Monthly Catalog	Jul. 1973+
National Technical Information Service	1964+
Oceanic Abstracts	1964+
Pollution Abstracts	1970+
PTS Funk and Scott Indexes	1972+
PTS Federal Index	Oct. 1976+
PTS Promt	1972+
PTS Annual Time Series	Jul. 1971+
PTS US Statistical Abstracts	Jul. 1971+
Rubber & Plastics Research Association Abstracts	1972+
SciSearch	Jan. 1974+
Smithsonian Science Information Exchange	Most Recent 2 Yrs.
Current Research Information System	Jul. 1974+
Compendex	1970+
Inspec	1969+
Metadex	1966+
Pira	1975+
Claims/U.S. Patent	Abstracts Weekly
Claims/U.S. Patent	1971+
Claims/Class	Oct. 1975+

Appendix II

On-Line Databases Searched (cont'd)

Lockheed Information Systems (DIALOG)

Search Strategy
Hexa(w)chloro(w)ethane
Hexachloroethane
Hexachloro(w)ethane
Avlothane
Carbon(w)hexachloride
Carbon(w)hexa(w)chloride
Distokal
Distopan
Egitol
Ethane(w)hexachloride
Ethane(w)hexa(w)chloride
Ethylene(w)hexachloride
Ethylene(w)hexa(w)chloride
Hexa(w)chloro(w)ethylene
Hexachloroethylene
Falkitol
Fasciolin
Hexachlo(w)aethan
Mottenhexe
Per(w)chloro(w)ethane
Perchloro(w)ethane
Perchloroethane
Phenohep

RN 67-72-1 used in appropriate files

Appendix II

On-Line Databases Searched (cont'd)

Systems Development Corporation (ORBIT)

Database	Coverage Period of File
+ indicates that the database is continually updated.	
Apilit	1974+
Apipat	1964+
Chemdex	1972+
Crecord	1976+
Fedreg	Mar. 1977+
Libcon	1968+
Paperchem	1968+
P/E News	1975
Safety Science	Jun. 1975+
Titus	1970+
World Patent Index	1963+

Search Strategy
(RN) 67-72-1 (in appropriate files)
Hexachloroethane
Avlothane
Carbon and Hexachloride
Distokal
Distopan
Egitol
Ethane and Hexachloride
Ethylene and Hexachloride
Falkitol
Fasciolin
Hexachlo and aethan
Hexachloroethylene
Mottenhexe
Perchloroethane
Phenohep

All search statements were combined with the logical operator "or" before printout.